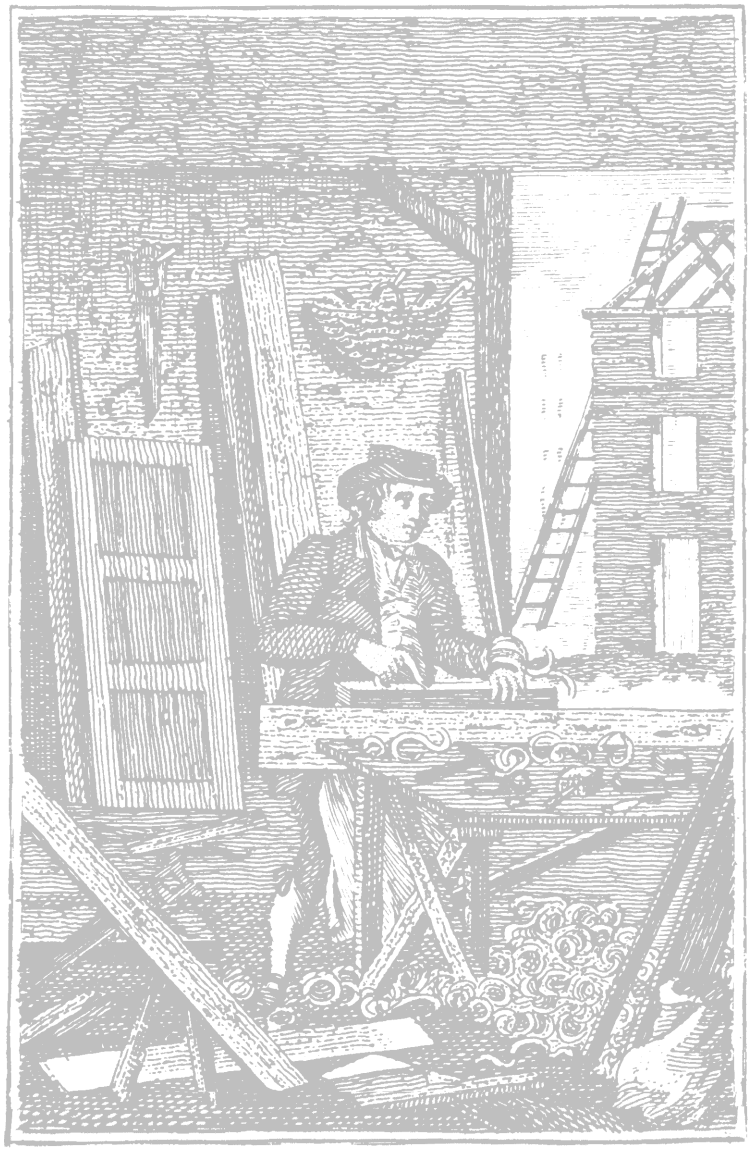
National Park Service
Standard Fabrication Specifications

Division of Exhibits
Harpers Ferry Center



July 1997

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Division I

Project Management

PART I: GENERAL

1.1 WORK INCLUDED: Scheduling, coordinating, overseeing, and managing work produced and installed under this contract.

1.2 CONTACTS: The Project Manager shall be the single point of contact between the Contractor and the National Park Service (NPS) Contracting Officer's Technical Representative (COTR).

1.3 SPECIFIC REQUIREMENTS: The Contractor's Project Manager shall be in contact with the COTR, Harpers Ferry Center, on no less than a weekly basis. The Project Manager shall perform the following work:

A. Meet with the Contracting Officer and COTR for the Postaward Conference in accordance with this Division, Part II, 2.1.

B. Travel as specified in accordance with this Division, Part III, and Section G.

C. Receive all Government-Furnished materials and inspect the materials to ensure that the quality is suitable for use in the exhibit. The Project Manager shall notify the COTR if Government-Furnished materials are not received in sufficient time to meet critical milestones, if damaged, or when use of the material would result in an unsatisfactory product.

D. Identify and compile all resource material into a production package and ensure that this material is forwarded to the appropriate unit or person within the Contractor's organization for use in the project.

E. Coordinate all Contractor's submittals as specified in each Division and review them for legibility, accuracy, completeness, and compliance with contract requirements. Forward all submittals to the COTR for review and approval.

F. Receive all reviewed submittals and take appropriate action according to the approval or rejection by the COTR.

(1) Approved Submittals - Ensure that all changes, revisions, or additions are noted, and in-house drawings and instructions are updated and forwarded to the COTR.

(2) Rejected Submittals - When submittals are rejected, the COTR will return one (1) copy of the submittal to the Project Manager with reasons for rejection. The Project Manager shall resubmit, identifying changes.

G. Provide quality control of work. Ensure that all elements of project work meet the requirements of the contract Specifications and all modifications or revisions are implemented.

H. Track work progress to ensure that the project is completed according to the schedule. Coordinate and confirm the dates for shipment, delivery, and installation of the work at the exhibit site with the COTR.

I. Inspect completed work prior to shipment or final inspection by the COTR to ensure that work meets the quality standard specified in this contract. Ensure that all elements of the project are complete and ready for the final inspection, notifying the COTR if any elements will not be ready for final inspection as scheduled.

J. Delivery and Installation - Ensure that all work is delivered and installed as scheduled. In the event that the COTR reports problems during or after shipment, delivery, and/or installation, the Project Manager shall:

(1) Determine the nature of the reported problem, damage, or production error and provide a proposal for resolution to the COTR for review and approval; and

(2) Ensure that approved corrections or repairs are made in a satisfactory manner and within the time scheduled by the COTR.

K. Compile, prepare, and forward a closeout package to the COTR in accordance with Division IX.

PART II: PROJECT MEETINGS

2.1 POSTAWARD CONFERENCE: The minimum agenda for the meeting will include the following:

A. General project review, including discussion of the following:

(1) Contracting Officer and COTR responsibilities;

(2) Specifications and other work requirements;

(3) Special contract requirements;

(4) Correspondence procedures;

(5) Subcontractors;

(6) Delays and extensions;

(7) Contract modifications;

(8) Changes;

(9) Submittals;

(10) Project schedule;

(11) Orientation to the park, including key personnel, location, and special conditions on-site; and

(12) Billing and payment procedures.

B. Review of exhibit plan drawings and exhibit plan notebook.

C. Review of Government-Furnished reference and source materials.

D. Provide Government-Furnished material to the Contractor, including exhibit plan drawings, exhibit plan notebook, reference and source materials, and other related materials.

E. Inspect and measure artifacts, verifying final dimensions.

2.2 PROGRESS MEETINGS AND INSPECTIONS: The COTR will schedule progress meetings to coincide with project work inspections at the Contractor's facility. The minimum agenda for the meeting will include the following:

A. Inspection of work in progress and completed work;

B. Identification of problem areas and discussion of proposed solutions;

C. Review of schedule;

D. Discussion of planned progress during succeeding work period; and

E. Discussion of work standards and practices to maintain quality.

2.3 PRE-INSTALLATION MEETING: The COTR will meet with the Project Manager, Installation Team, and others of the Contractor's staff, at the Contractor's facility, prior to shipping and installation of the exhibits. The minimum agenda for the meeting will include the following:

A. Inspection of the fully setup staged exhibit as specified in Division VIII.

B. Review of existing conditions at the installation site, identifying potential problems and proposed solutions.

C. Review of installation schedule, including:

(1) Sequence in which work will be shipped, unloaded, setup, and installed; and

(2) Projected work schedules on-site, including working days and hours.

D. Review of Preliminary Maintenance Manual in accordance with Division IX.

2.4 MEETING DOCUMENTATION: After all scheduled meetings, the Project Manager shall prepare and provide written documentation to the COTR enumerating all issues discussed and decisions made relative to the project.

PART III: TRAVEL

3.1 POSTAWARD CONFERENCE: Travel to Harpers Ferry Center, Harpers Ferry, West Virginia for Postaward Conference as specified in this Division, Part II, 2.1.

3.2 SITE VISIT: Travel to the park for a Site Visit to meet with the COTR to review existing conditions prior to fabrication of the exhibits, including the following:

A. Assess existing conditions for on-site work. Take detailed measurements of the exhibit space to ensure proper fit of all exhibit elements. The Contractor shall assess locations of heating and ventilation ducts, doors, windows, lighting fixtures, wall switches and controls, security system alarms and sensors, changes in floor level, floor finishes, ceiling beams, building structures and finishes, and other elements which impact on proper fit and operation of the exhibits.

B. Assess existing conditions which impact the installation of the exhibits, including: unloading areas, doorway clearances, curbs, stairs, elevators, available storage areas, available areas for setup of power tool work stations, off-site facilities for disposal of debris, parking, and local availability of food, gas, hardware, and other supplies and services.

C. Assess existing electrical and lighting systems for determination of their impact on installation and operation of all exhibit elements.

D. Inspect and measure artifacts, verifying final dimensions.

3.3 INSTALLATION: Travel to the park to oversee installation of exhibits at the site by the Installation Team in accordance with Division VIII and to submit the Final Maintenance Manuals to the COTR, in accordance with Division IX.

Division II

Exhibit Drawings

PART I: GENERAL

1.1 WORK INCLUDED: Preparation of preliminary and final exhibit drawings.

1.2 SPECIFIC REQUIREMENTS:

A. Review all measurements relating to the fabrication and installation of work required under this contract.

B. Prepare preliminary and final exhibit drawings, incorporating all changes.

C. Execute isometric drawings to indicate access into all exhibit structures for maintenance, repairs, and re-lamping of lighting fixtures.

D. Prepare as-built drawing package. The Contractor shall make all approved revisions and additions to the Government-Furnished original vellum drawings.

E. Provide up-to-date information on the drawings, including all products, colors, finishes, and materials, identifying manufacturers and associated color or finish numbers.

PART II: MATERIALS

2.1 DRAWING SHEETS: 34" x 22" vellum shall be used for all drawings.

2.2 OTHER MATERIALS: The Contractor shall provide materials for the production of work included in this Division.

PART III: DRAWING FORMAT

3.1 DRAWINGS: Drawings shall include proper identification, fully dimensioned drawings of the case or exhibit element, material, color, and finish call-outs and shall show all methods of fabrication.

3.2 AS-BUILT DRAWINGS: The Contractor shall make approved revisions and additions to the Government-Furnished original vellum drawing package to produce a complete as-built package. The Contractor shall include any additional pages generated during fabrication and renumber the full set of vellum drawings.

PART IV: EXECUTION

4.1 DRAWING REPRODUCTION: Completed drawings are entered into the Government microfilm system. Therefore, the Contractor shall prepare them so that they can be reproduced as clear and legible half-size prints.

4.2 DRAFTING TECHNIQUE: The drawings shall possess consistent line density and clear legible lettering. Duplicates that cannot be reproduced as clear, legible, half-size prints are unacceptable. Original drawings that combine ink and pencil, contain miscellaneous adhesive-backed material, visible layout lines, or poor quality line work are also unacceptable.

The following drafting practices shall be utilized: Maintain even line weight and avoid line congestion, match line weight when making additions or changes, keep drawings clean and uncreased and keep erasures at a minimum, with no ghosting. Differentiate outlines and section lines by varying the width or thickness of lines, not by changing densities. Use line work techniques for distinctive symbols and crosshatching, do not use pencil shading or toning. Ensure open spacing of lines and lettering, use mechanical or clear, legible hand lettering.

4.3 SCALE AND DIMENSIONS: All dimensions 1'-0" and over shall be specified in feet and inches. Common industry measure shall also be used, i.e., 48" pipe, 16" o.c. The following scales shall be used at all times:

A. Plan and Elevation Views - 1-1/2" scale or 1" scale.

B. Section - Full size, 1-1/2" scale or 1" scale.

C. Isometric - 1-1/2" or 1" scale.

4.4 SYMBOLS: The Contractor shall use American National Standards symbols.

4.5 ABBREVIATIONS: The Contractor shall provide a key to clearly identify all terms and abbreviations used on the drawings.

4.6 IDENTIFICATION: Each drawing shall be identified with the park name, project name, exhibit number, and date of submittal.

PART V: SUBMITTALS AND APPROVALS

5.1 PRELIMINARY DRAWINGS: The Contractor shall prepare and submit, for review and approval by the COTR, preliminary and final drawings consisting of changed requirements identified during the Site Visit, as follows:

A. Three (3) full-size copies of preliminary drawings and sketches, of proposed alterations, revisions, and corrections;

B. The COTR will review and approve these drawings and sketches and mark up, in red, one (1) set of full-size prints and return them to the Contractor. All drawings will be initialed by the COTR. Approval by anyone other than the COTR does not constitute approval to proceed with the work;

C. Catalog Cuts - The Contractor shall submit catalog cuts of proposed materials, substitutions, or alternatives prior to inclusion into the drawings or use during fabrication; and

D. Revisions - Revisions to the preliminary drawings shall be done in accordance with the COTR's mark ups. The Contractor shall not have developed the detailing work on these drawings to such a degree at this stage, that it is impossible to change, continue development, or revise the work without causing delay of the project.

5.2 FINAL DRAWINGS: Working from the set of approved preliminary drawings, the Contractor shall include all corrections and revisions and prepare final drawings, for review and approval by the COTR, as follows:

A. Three (3) full-size copies of the final drawings;

B. The COTR will review and approve these drawings and mark up, in red, one (1) set of full-size prints and return them to the Contractor. All drawings will be initialed by the COTR. Approval by anyone other than the COTR does not constitute approval to proceed with the work;

C. Revisions - Revisions to the final drawings shall be done in accordance with the COTR's mark-ups; and

D. Three (3) full-size copies of the revised final drawings.

5.3 AS-BUILT DRAWINGS: The Contractor shall prepare a complete set of as-built drawings containing all approved revisions and additions to the original plan. The Contractor shall include any additional pages approved during fabrication and renumber the full set of original vellum drawings.

5.4 ORIGINAL DRAWINGS: All originals drawings, produced under this contract will be the property of the Government.

Division III

Exhibit Structures

PART I: GENERAL

1.1 WORK INCLUDED: Fabrication of all exhibit elements including: Cabinetry, panels, platforms, vitrines, or other elements which constitute the basic structural elements of the exhibits.

1.2 QUALITY ASSURANCE: Refer to the Architectural Woodwork Institute Quality Standards for cabinetry and laminate work. All manufacturer's printed recommendations for materials, coatings, and adhesives are a part of this Specification. Copies of this publication are available from:

Architectural Woodwork Institute
1952 Isaac Newton Square
Reston, Virginia 20190
703-733-0600

1.3 EXHIBIT DRAWINGS: In accordance with Division II.

1.4 PRODUCT HANDLING: Store lumber and millwork in a dry location. Do not expose wood to extreme changes of temperature or humidity. Protect panels, cases, and structures from damage during shipping, handling, production, storage, and installation.

PART II: MATERIALS

All materials, unless otherwise specified, shall be new and of the kind and quality specified.

2.1 WOOD PRODUCTS - As specified on the drawings:

A. Plywood - APA (American Plywood Association) sanded and touch-sanded, Grade B or better Birch veneer.

B. Specialty Panels:

(1) Marine Grade Birch.

(2) Bending Plywood.

(3) Medium Density Fiberboard (MDF) - Formaldehyde free, as manufactured by:

Medite Corporation
P.O. Box 4040
Medford, Oregon 97501
800-676-3339

(4) Hardboard - Tempered both sides, as manufactured by:

Wood Fiber Industries
Division of Masonite Corporation
1 South Wacker Drive
Chicago, Illinois 60606
312-407-9210

C. Framing Lumber - Number 2 Grade Poplar, Douglas Fir, or Number 1 Grade Southern Pine.

2.2 PLASTICS - As specified on the drawings:

A. Cast Acrylic Sheet:

(1) Plexiglas G sheet, clear.

(2) UF-3 Plexiglas, as manufactured by:

Atohaas North America, Inc.
Independence Mall West
Philadelphia, Pennsylvania 19105
215-592-3000

(3) Acrylite OP-2, as manufactured by:

CYRO Industries
100 Valley Road
P.O. Box 950
Mt. Arlington, New Jersey 07856
201-770-6063

B. Laminate - High pressure decorative laminates shall meet the minimum performance standards of the International Organization of Standardization ISO-4586-2 and National Electrical Manufacturer's Association, LD3-1980. Laminate shall be .063 face grade.

C. Specialty:

(1) Colored, Diffusing, and Non-Glare Acrylic - As manufactured by Atohaas North America, Inc., as specified in this Division, Part II, 2.2.A.(2).

(2) Extrusions.

(3) Moderately Expanded PVC Sheet.

2.3 METALS - As specified on the drawings:

A. Steel:

(1) Flat Plate.

(2) Beams, Bars, Channels, Tubing, and Pipe.

(3) Cable - Stainless steel, nonmagnetic, and uncoated.

(4) Audiovisual Equipment Shelving - Perforated 12 gauge carbon steel plate with 1/2" holes at 11/16" centers, staggered.

B. Stainless Steel.

C. Aluminum:

(1) Flat Plate - Anodized.

(2) Extrusions - Shapes for structural supports shall be 6060-T6 or 6063-T52 alloy.

(3) Perforated Sheet.

(4) Sheet Aluminum.

2.4 GLASS - As specified on the drawings:

A. Laminated Safety Glass:

(1) Reflective - Clear, UV filtering laminated safety glass with PVB (polyvinyl butyryl) layer between two (2) laminations.

(2) Non-Reflective - Clear Amiran, as manufactured by:

Schott Corporation
Technical Glass Division
Three Odell Plaza
Yonkers, New York 10701
914-968-8900

B. Tempered Glass.

2.5 GASKETING: The Contractor shall use only gasketing made from silicone sponge for sealing any air space shared with the artifacts inside the vitrine. The following products are acceptable gasketing materials for vitrines, as specified on the drawings:

A. BF1000, Number 603, silicone sponge gasketing material, soft density, white, with acrylic adhesive backing, as manufactured by:

Delta Design Ltd.
P.O. Box 1733
Topeka, Kansas 66601
903-234-2244

B. COHR Lastic, Number R10480, silicone sponge foam, soft density, 1/8" thick, as manufactured by:

COHR Industries
407 East Street
P.O. Box 1911
New Haven, Connecticut 06509-9988
800-243-8160

C. Cellular Silicone Sponge, HT 810, HT 815, adhesive-backed, silicone, Dimethyl-Poly-Siloxame, modified closed cell sheet, low density, compression set - maximum 10%, chemically inert, as manufactured by:

Bisco Products, Inc.
2300 East Devon Avenue
Elk Grove Village, Illinois 60007
800-237-2068

2.6 ADHESIVES AND SEALANTS - As specified on the drawings or recommended in the manufacturer's specifications for installation of materials.

A. Laminate Applications:

(1) Laminate-to-Substrate - Use a nonpigmented contact cement or manufacturer's recommended adhesive.

(2) Laminate-to-Laminate - Use a nonpigmented two-part epoxy or manufacturer's recommended adhesive.

B. Glass - Silicone SCS 1201, clear, white, or black, as manufactured by:

General Electric Company
Silicone Products Division
260 Hudson River Road
Waterford, New York 12188
800-332-3390 or 518-237-3330

C. Artifact Cases and Case Components - Such as platforms, pedestals, and panels :

(1) Wood Sealant - Use Polyglase Waterborne Wood/Metal/Plastic Environmental Coating to seal all exposed wood inside the vitrine and desiccant chamber airspace. Surfaces finished with plastic laminate do not require any additional sealant. Polyglase is manufactured by:

Camger Chemical Systems, Inc.
364 Main Street
Norfolk, Massachusetts 02056
508-528-5787

Polyglase Waterborne Finish is a water based aliphatic urethane. The Contractor shall follow manufacturer’s specifications for application of the finish.

(2) Crack and Gap Sealant - To ensure a tight seal, fill all seams which could allow air exchange with outside air with silicone caulk that is neutral curing (does not emit acetic acid during curing), Number 2501 clear or Number 2602 white, as manufactured by General Electric Company, as specified in this Division, Part II, 2.6.B.

(3) Gasketing - The Contractor shall use gasketing made from silicone sponge, extruded silicone and EPDM products for sealing air chambers shared with artifacts inside cases. The following products shall be used as gasketing materials for museum artifact cases:

(a) BF1000, Number 603, silicone sponge gasketing material, soft density, white, with acrylic adhesive backing, in thicknesses and widths specified, as manufactured by:

Delta Design Ltd.
P.O. Box 1733
Topeka, Kansas 66601
903-234-2244

(b) COHR Lastic, Number R10480, silicone sponge foam, soft density, 1/8" thick, as manufactured by:

COHR Industries
407 East Street
P.O. Box 1911
New Haven, Connecticut 06509-9988
800-243-8160

(c) Cellular Silicone Sponge HT 810, HT 815, adhesive-backed, silicone, Dimethyl-Poly-Siloxame, modified closed cell sheet, low density, compression set - maximum 10%, chemically inert, as manufactured by:

Bisco Products, Inc.
2300 East Devon Avenue
Elk Grove Village, Illinois 60007
800-237-2068

(d) Extruded Silicone and EPDM, as manufactured by one of the following:

Clean Seal, Inc.
2114 Lynn Street
Mishawaka, Indiana 46545
800-366-3682

Resource Conservation Technology, Inc.
2633 North Calvert Street
Baltimore, Maryland 21218
410-366-1146

Art Preservation Services
223 East 85th Street, Suite B2
New York, New York 10028
212-988-3869

D. General Purpose Caulk - Clear silicone rubber, standard grade RTV Silicone Number 108, as manufactured by General Electric Company, as specified in this Division, Part II, 2.6.B.

E. Acrylic Cement - Weldon 40 adhesive, as manufactured by:

IPS Corporation
455-T West Victoria Street
Compton, California 90220
310-898-3300

2.7 FINISHES - As specified on the drawings:

A. Paint:

(1) Aluminum and Steel:

(a) Polane Polyurethane Enamel, as manufactured by:

Sherwin Williams Company
Chemical Coatings Division
P.O. Box 6027
Cleveland, Ohio 44101-1027
216-566-2000

(b) Polane-T (textured finish) Polyurethane Enamel - With caustic etch and eridite primer, as manufactured by Sherwin Williams Company, as specified in this Division, Part II. 2.7.A(1)(a).

(c) Powder Coating, as manufactured by:

Tiger Drylac USA
1100 Commons Boulevard
Reading, Pennsylvania 19605
215-926-8148

(2) Miscellaneous Material Surfaces.

B. Stain.

C. Clear Coat.

D. Fabric.

E. Faux Finishes.

2.8 HARDWARE:

A. Rough - Nails, screws, bolts, nuts, washers, anchors, threaded inserts, flush clips, and similar items of proper size and number to secure material in place. Any fasteners used in areas where moisture is a factor shall be galvanized or aluminum.

B. Finish - Hinges, key hole fasteners, concealed hinges, cam locks, slides, push locks and keys, casters, levelers, handles, and knobs as specified in approved drawings and catalog cuts. All doors in exhibit structures which provide access to interior storage cabinetry and audiovisual equipment shall be fastened with concealed hinges and provided with locks.

C. Security Screws - Stainless steel tamper resistant screws and matching tools, as specified in approved drawings and catalog cuts.

D. Locks which are installed as multiples shall be keyed alike.

E. Glass Suction Cups.

2.9 FLOORING - As specified on the drawings.

PART III: EXECUTION

3.1 WOODWORKING:

A. Quality - The Architectural Woodwork Quality Standards, as published by the Architectural Woodwork Institute (AWI), are by reference made part of this Specification. Unless otherwise clearly detailed or specified, all cabinetry shall be fabricated to conform to AWI Quality Standards, Section 400, for Custom Grade material and workmanship.

B. Fabrication - All case work shall be plant assembled. Cases too large for access into the exhibit area shall be made in attachable sections with provisions for reassembly in the exhibit space. All faceplates, panel ends, and doors shall be of mortise and tenon or doweled fabrication, glued under pressure, with nails only furnishing the pressure.

All nails shall be properly set for filling. Filled areas shall be sanded smooth to receive laminate, paint, or other specified finish.

Edges of panels and signs shall be filled, sanded smooth, and finished or covered with material matching the panel face. Edges shall not be left unfinished unless otherwise specified on the drawings. All laminate and substrate shall be stored together for at least 72 hours and assembled in an environment of approximately 70 degrees Fahrenheit and 50% relative humidity.

C. Shelving:

(1) Any shelving used as a part of the interior of cabinets shall have a thickness of 3/4."

(2) At a minimum, audiovisual equipment shelves shall have 12” square center portions of perforated metal to allow ventilation around equipment. The Contractor shall be responsible for ensuring that each shelf is fabricated of material of sufficient strength for the piece of equipment for which it is intended.

D. Silica Gel Chambers - Chambers which house silica gel shall be fabricated to minimize exchange of air with outside of the chamber. The chamber shall provide a sealed, stable environment necessary to protect the artifact(s) in the case.

E. Veneer - All veneer shall be ordered in a minimum 3:1 ratio per square foot of plywood substrate required. Face veneer shall be flat sliced with adjacent pieces randomly matched. The maximum width of sapwood per flitch shall not exceed 2". Panel face assembly shall be running matched. Veneer millwork shall be sequence matched. All edges shall be veneer banded on all four (4) edges for final use in the exhibit.

3.2 METAL WORK: Fabricate to detail and finish as specified on the drawings. Use appropriate fastening devices and welding materials, grind welds smooth, and ease all sharp or ragged edges. All metals shall be prepared and painted in accordance with the paint manufacturer's specifications.

3.3 FINISH HARDWARE OR FASTENERS: Shall be applied and installed so they are fully functional. Screws shall be countersunk to flush level with surface, free of burrs, and at a 90 degree angle to the surface plane.

3.4 PLASTIC: Follow manufacturers' printed instructions. Cut material to the size specified on the drawings, allowing for expansion and contraction. Welded joints shall be free of gaps and bubbles, continuously sealed, and absolutely clear. All exposed edges shall be hand polished, no flame polishing. Surfaces of acrylic shall be free of scratches, stains, or other imperfections.

3.5 GLASS: Cut material to size specified on the drawings, allowing for expansion and contraction. Surfaces shall be free of scratches, bubbles, stains, rough edges, or other imperfections.

A. Laminated Safety Glass - All exposed edges shall be eased and finely ground to be smooth, with broad surfaces free of imperfections.

B. Tempered Safety Glass - All exposed edges shall be polished, with broad surfaces free of visible tong marks or any other imperfections.

3.6 FINISHED SUBSTRATES: Surfaces scheduled to receive etching, sandblasting, paint, laminate, photo mounts, or graphic finishes shall be made true and even with joints and nail holes, primed, sealed, and properly supported to prevent warping or bending.

A. Paint - All exposed surfaces to receive paint shall be finished smooth. Finished paint surface shall be without runs, sags, and other imperfections. Match colors specified on the drawings. Colors shall be consistent from surface-to-surface. Paint shall be applied under dry, dust-free conditions, in accordance with the manufacturer's specifications. Edges, crevices, corners, and joints shall be thoroughly cleaned. Painting shall be of uniform thickness.

All exposed edges of painted panels shall be filled, sanded, and painted to match the panel face unless otherwise specified on the drawings.

(1) Concealed Areas - Those areas completely enclosed by solid opaque framing and skin. No finishing required.

(2) Semi-Exposed Areas - Those areas only visible by opening doors or access panels. Finish with wood sealer.

(3) Flat Panels, Framed - The back side of plywood or other framed material. A minimum of two (2) coats flat lacquer primer for the surface.

(4) Flat Panels, Unframed - The back side of plywood or other material without framing such as cabinet doors and applied panels. A minimum of three (3) coats of paint, laminate backing sheet, or other finish equal in density and weight to that specified on the drawings for the exposed surfaces.

(5) Edges - All exposed edges of panels, plaques, and photos shall be fitted and sanded smooth. Edges shall be finished to match adjoining surfaces as specified on the drawings.

(6) Panel Backs - Backs of panels shall be finished with a spray-applied lacquer finish or laminate backing sheet in color specified on the drawings.

B. High Pressure Plastic Laminate - Face of the substrate shall be sanded smooth and free of grease, wax, dust, or other contaminates which interfere with adhesion. Control of the glue line and its thickness and uniformity of spread shall be given constant attention. Spot bonding shall never be used. Cover all areas where contact is made with adhesive. **IN ALL CASES, THE ADHESIVE MANUFACTURER'S INSTRUCTIONS FOR USE SHALL BE FOLLOWED.** Avoid chipping of laminate by the saw blade. Finish smooth edges on curved cut by sawing the part oversize and finish it by routing, filing, or sanding. When cutting laminate, make certain to prevent hairline cracks or over-cutting at inside corners. Inside corners shall be rounded to prevent corner cracking.

3.7 FLOORING - As specified on the drawings. Installation shall be in accordance with manufacturer’s specifications.

3.8 ARCHITECTURAL MILLWORK: Fabricate and assemble units complete in the shop, insofar as their dimensions will permit for transportation and proper handling. All woodwork shall be shop finished and delivered to the installation site with protective covering. Use solid stock for frames, jambs, heads, stops, and edges. Where veneer plywood is used, trim exposed edges with hardwood without face nailings. Accurately fit and align separate parts. Provide ample screw, glue-and-bolt blocks, draw-bolts, tongues, grooves, splines, dowels, tenons, mortises, and other means of fastening to render the work substantial, rigid, and permanently secured in the proper position. Provide material to permit scribing to walls, floors, and related work. Provide sufficient allowance for shrinkage occurring after installation. Provide mitered corners at door frames with hairline joints. Fit and adjust doors to achieve smooth and noiseless operation. Exposed fasteners are unacceptable without specific approval from the COTR. Countersink face nails and face screws, fill with plastic wood or wood plugs, sand flush to surface, and finish without visible markings.

3.9 ARTIFACT CASES:

A. Wood - Unless otherwise specified, use two (2) coats of Polyglase Waterborne Wood/Metal/Plastic Environmental Coating. Polyglase Waterborne Finish is a clear, water-based aliphatic urethane, available in flat or semi-gloss. The Contractor shall follow manufacturer's specifications for the application of the finish to seal all exposed wood in the artifact chamber and desiccant chamber air space.

B. Crack and Gap - To ensure that artifact vitrines are as airtight as possible, seal all seams which could allow air exchange with the air outside the vitrine. Seal seams with a silicone caulk which is neutral curing and does not emit acetic acid during curing.

PART IV: SUBMITTALS AND APPROVALS

Submittals shall include:

4.1 Approved detail drawings specified in Division II.

4.2 Color and finish samples for exhibit structures, including finish woods, masonry, metals, laminates, paints, stains, varnishes, veneers, fabrics, and faux finishes. Each sample shall be identified with the brand name, number, color name, and the manufacturer's name, address, and telephone number.

4.3 Catalog cuts for locks, security hardware, specialized hardware and off-the-shelf items provided by the Contractor.

Division IV

Electrical and Mechanical

PART I: GENERAL

1.1 WORK INCLUDED: Purchase, fabricate, assemble, install into buildings and exhibit structures, and thoroughly test all electrical and mechanical devices; this includes lighting. Install audiovisual equipment into exhibit structures, including electrical components to provide and ensure fully operational audiovisual systems for each exhibit unit.

1.2 QUALITY ASSURANCE: The National Electrical Code shall be the required standard for all electrical work. In the event other codes, state, and local, are in effect at the final exhibit site, they shall be included as part of this Specification and requirement. All manufacturer's printed recommendations for materials are a part of this Specification. Standards for other trades are included as part of this contract.

1.3 EXHIBIT DRAWINGS: In accordance with Division II.

1.4 PRODUCT HANDLING: Store electrical and mechanical components in a dry location. Do not expose to extreme changes of temperature and humidity. Protect components from damage during shipping, handling, storage, and installation. Exercise care so as not to damage electrical components. Store in a protected environment.

1.5 TESTING: Mechanical, electrical, lighting, and audiovisual components of exhibits shall be fully tested and operational in the Contractor's shop, prior to delivery to the exhibit site.

PART II: MATERIALS

2.1 ELECTRICAL: Materials shall be new and U/L approved.

A. Wiring - 18 gauge stranded, Number 14 solid copper, or as necessary to satisfy code and specifications for 120V and 12V applications. Jacketed, labeled, and U/L listed only. Type E, U/L listed teflon jacketed hookup wire for standard electrical control circuits and switching.

B. Conduit - Minimum size of conduit shall be 3/4."

C. Outlets - Multi-outlet power strips with integral circuit breaker and ground outlets.

2.2 LIGHTING - As specified on the drawings or in Attachment E, Lighting Schedule:

A. Exhibit Lighting Fixtures and Accessories.

B. Lamps - As required to make illuminated exhibit elements complete and fully functional.

C. Lighting Dimmer Controls, as manufactured by:

Leviton Manufacturing Company, Inc.
59-25 Little Neck Parkway
Little Neck, New York 11362-2591
800-323-8920

D. LEDs (Light Emitting Diodes).

E. Remote Source Lighting:

(1) Optical Fiber:

(a) Glass - Cladded, with type, gauge, and running length.

(b) Acrylic (polymethyl methacrylate/PMMA) - Eska fiber with integral fluorine polymer cladding, type, gauge, and running length, as manufactured by:

Mitsubishi International Corporation
520 Madison Avenue
New York, New York 10022-4223
212-605-2392

(2) Illuminator - Halogen lighting source with voltage, port volume, fiber capacity, and cooling mechanism.

(3) Lenses and Accessories.

F. Artifact Case Ultraviolet (UV) Filter - Fluorescent lighting for illumination of artifact case interiors shall be filtered through one (1) of the UV-filtering acrylics, specified in Division III, 2.2.A (1) through (3).

2.3 MECHANICAL - As specified on the drawings:

A. Timer Control and Custom Circuit Board, as manufactured by:

Bayside Controls
173 Ludlow Avenue
Northvale, New Jersey 07647
201-767-1509

B. Ventilation Fan - Dayton axial fan, Model 4C596 square, as manufactured by:

W.W. Granger, Inc.
Distribution Group Offices
5959 Howard Street
Chicago, Illinois 60648
812-647-8900

C. Infrared Motion Detector - Topaz Plus Number 1876-2 Twin Element PIR detector that requires a 12VDC power supply to operate, as manufactured by:

ADEMCO, Inc.
11438 Cronridge Drive
Owings Mills, Maryland 21117
410-363-4047

D. Thermostat - Line voltage, Model 2E340A, as manufactured by W.W. Granger, Inc., as specified in this Division, Part II, 2.3.B.

E. Pushbutton - Round, Model Number 2900-387, red, or Model Number 2900-448, white, as manufactured by:

Wico
26 Madison Road
Fairfield, New Jersey 07006-2390
201-575-0515

Coin Acceptors
701 Parkway View Drive
Pittsburgh, Pennsylvania 15205
412-774-5103

F. Illuminated Pushbutton with or without Custom Graphics - Model Number 54-0004-2X, as manufactured by:

Happ Controls, Inc.
106 Garlish Drive
Elk Grove, Illinois 60007
708-593-6130

G. Telephone Handset Assembly - Commercial grade, hookswitch, cradle, lanyard, keypad, and faceplate, as manufactured by:

Quadrum Telecom
700 Boulevard South
Suite 501
Huntsville, Alabama 35802
800-638-4420

2.4 AUDIOVISUAL EQUIPMENT: The Contractor shall install audiovisual equipment in accordance with Attachment F, Audiovisual Equipment Schedule. Cables, connectors, racks, and mounting accessories required for proper installation and operation of the equipment shall be provided by the Contractor.

PART III: EXECUTION

3.1 ELECTRICAL - Contractor shall obtain all requirements pertaining to state and local codes:

A. Power - Circuits within each installed exhibit structure shall be distributed from one (1) four (4) gang box mounted inside the exhibit structure. The box shall be connected to the power source (120 volts AC) through flexible conduit. Power supplies for the lighting systems and lighting shall be hard wired to the power source (120 volt AC) through flexible conduit. Provide sufficient extra length of flexible conduit to accommodate movement of power supply on sliding access shelf. All connections to power sources shall be made at the locations specified on the drawings.

The Contractor shall evaluate power supply versus power demand to determine the appropriateness of existing circuits and ensure that power cables do not cause interference with audiovisual signal cables.

It shall be the responsibility of the Contractor to advise the COTR if total power service requirements for any exhibit structure exceed 15 amperes.

B. Coordination - Provide secondary distribution lines and one (1) three (3) prong female receptacle within each applicable exhibit unit for hookup of electrical equipment.

C. Craftsmanship - Circuits shall be clearly and neatly labeled with special operating and maintenance instructions mounted on descriptive panels within each applicable exhibit unit. Run wiring exposed to minor potential physical damage in thin wall metallic tubing. Run inaccessible wiring in conduit. All conduit, junction boxes, fixtures, and equipment shall be neatly and securely attached to support members and concealed.

Provide secondary distribution lines within each applicable exhibit unit. Provide receptacles, plugs, slip, or screw terminals to facilitate removal or replacement of equipment. Provide switches to ensure independent operation of individual components or devices found within the same exhibit unit. All work shall be properly grounded.

D. Access - Ensure serviceability to each and every piece of equipment. Provide cut-outs and access panels to facilitate maintenance. Avoid alterations to exposed surfaces.

E. Support - Furnish additional support such as clip angles, plates, brackets, thrust blocks, bushings, and bearings necessary to reinforce exhibit structures, and devices relative to "hands-on" use and abuse of each exhibit.

F. Termination of Wiring - Conductors shall be terminated at ends where attached to components using crimp-type lugs if the component possesses screw-type terminals. Where the component has only soldering lugs, connection shall be by good quality soldered electrical joint. Connection of conductors and wiring, one to another, shall be by insulated quick disconnects or with wire nuts of the correct size. The use of electrical insulating tape is not acceptable.

3.2 LIGHTING:

A. Interior Exhibit Structure - The Contractor, in conjunction with the COTR, shall review the lighting levels and heat output to ensure that proper environment of case interior is met during first inspection of case fabrication at the Contractor's facility.

B. Track - During the exhibit installation, the Contractor shall install and connect all lighting track to power source. The Contractor shall install, aim, adjust track lighting fixtures and accessories, and adjust lamp wattage and beam spread after the exhibits and artifacts are in place. Provide final placement and aiming of lighting fixtures on-site after installation of exhibits and case contents, including measurement and adjustment of exhibit lighting levels. This detailed information shall be included in the Maintenance Manuals.

C. Ceiling Recess or Wall Mount - During the exhibit installation, the Contractor shall install and connect all lighting fixtures to the power source. The Contractor shall install, aim and adjust lighting fixtures and accessories and adjust lamp wattage and beam spread after the exhibits and artifacts are in place.

D. Remote Source Lighting:

(1) Optimum performance and safety shall be critical in developing the remote source lighting system. The efficiency of light transmission depends on the constituent materials, the quality of the bond between the core and cladding, harware connectors, and polishing of fiber ends. Selection of fiber and illuminator shall result in a minimum color rendering index (CRI) rating of 90 and a maximum lighting loss of 4% per running foot length. Methods of reducing the footcandle levels without affecting color temperature shall include the use of mechanical diagrams, lighting screens installed at the lighting source, or neutral density filters mounted in or attached to the lenses. Infrared wavelength filtration shall be dealt with at the lighting source. Fiber runs shall not exceed 25 feet. Illuminators shall utilize lighting sources with a minimum lamp life rating of 1500 hours.

(2) During the exhibit installation, the Contractor shall install and connect all remote source lighting system components to the power source. The Contractor shall install, aim, and adjust lighting system components and adjust lenses and accessories after the exhibits and artifacts are in place.

3.3 MECHANICAL: The Contractor shall install mechanical devices in accordance with manufacturer’s written instructions into the exhibit structures and wire them to be fully operational at the time of final inspection.

3.4 AUDIOVISUAL EQUIPMENT:

A. The Contractor shall be responsible for ensuring that audiovisual equipment will fit and operate within the exhibit structures.

(1) At a minimum, one (1) type of each piece of Government-Furnished audiovisual equipment will be shipped to the Contractor's facility, by the Government within two (2) weeks of the Postaward Conference. The Contractor shall demonstrate the fit of the equipment to the COTR during a site inspection at the Contractor's facility.

(2) The Contractor shall test all audiovisual equipment to ensure operation.

(3) The Contractor shall ensure that all audiovisual equipment has adequate heat ventilation while operating in the exhibits, and there is access to the equipment for Government staff to perform maintenance or repairs.

(4) The Contractor shall ship audiovisual equipment and hardware in their possession to the park.

(5) The Contractor shall install all audiovisual components in the exhibits. The Contractor shall wire, program, and connect all audiovisual components to appropriate power source.

B. The Contractor shall install pushbuttons in the exhibit structures and wire them to be fully operational at the time of final inspection. The pushbutton assembly shall fit snugly into the panel with the outermost ring sitting flush against the panel surface. The Contractor shall label the attached wiring to clearly identify what component it activates when pushed.

C. The Contractor shall install commercial grade telephone handset assembly, hookswitch, cradle, lanyard, keypad, and faceplate in the exhibit structures and wire them to be fully operational at the time of final inspection.

3.5 AUDIOVISUAL EQUIPMENT INSTALLATION:

A. Installed equipment shall be easily accessible for cleaning, adjustment, replacement, and routine maintenance.

B. Switches, connectors, jacks, receptacles, outlets, cables, and cable terminations shall be logically and permanently marked as to their function. Custom panel nomenclature shall be engraved, etched, or screened.

C. With the exception of portable equipment, all boxes, conduits, cabinets, equipment, and related wiring shall be firmly held in place. Mounting shall be plumb and square.

D. Cables shall be free of splices between terminations at the specified equipment.

E. Wires and cables shall be formed into harnesses which are tied and supported in accordance with accepted engineering practice.

F. Harnessed cables shall be combed straight. Harnesses with intertwined members are unacceptable. Each cable that breaks out from a harness for termination shall be provided with a service loop. Cables shall be formed in either a vertical or horizontal relationship to equipment, controls, components, or terminations.

G. Power cables, control cables, and high level cables shall be run on the left side of an equipment rack, as viewed from the rear. All other cables shall be run on the right side of an equipment rack, as viewed from the rear.

H. Cables, except video cables, which must be cut to an electrical length, shall be cut to the length dictated by the run. For equipment mounted in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length.

I. Cables shall not be installed with a bend radius less than that recommended by the cable manufacturer.

J. Cables, regardless of length, shall be marked with wrap-around numbers and shall be shrink wrapped at both ends. There shall not be any unmarked cables in the system. Marking codes used on cables shall correspond to codes shown on drawings, run sheets, and patch panels.

K. Terminal blocks and connectors shall be furnished for all cables which interface with racks, cabinets, consoles, or equipment modules.

L. System components and related wiring shall be located to minimize electromagnetic and electrostatic noise, wiring length, and shall provide proper ventilation, safety, and convenience for the operator.

M. The Contractor shall verify all circuits and extensions for correct connection, continuity, and phasing. The Contractor shall make all adjustments and modifications so that all systems are operational.

PART IV: SUBMITTALS AND APPROVALS

Submittals shall include:

4.1 Catalog cuts and technical data for all Contractor-Purchased electrical, mechanical, and audiovisual equipment, including lighting fixtures and accessories, lamps, power supplies, connectors, switches, controls, pushbuttons, and other equipment.

4.2 A detailed as-built lighting plan which shows final fixture placement, the treatment of each fixture (lamp type, wattage, gel, diffuser, and louver), and instructions for re-lamping. This detailed information shall be included in the Maintenance Manuals.

4.3 Wiring schematic.

Division V

Photographs

PART I: GENERAL

1.1 WORK INCLUDED: Production of all photographic images.

1.2 SPECIFIC REQUIREMENTS:

A. Verify that photographic dimensions, orientation, and cropping will fit within the layout as designed.

B. Provide image scanning, photographic processing, printing, toning, spotting, retouching, color corrections, and mounting to exhibit structures. The Contractor shall provide negatives, internegatives, digital storage media, and photographic prints for Government-Furnished sources in accordance with Attachment B, Graphic Schedule.

C. Provide professional care and handling of source materials.

D. Return of all Government-Furnished materials to the COTR.

1.3 PRODUCT HANDLING: All Government-Furnished source materials shall be returned to the COTR unaltered and undamaged. Protection from loss and physical damage shall be provided by the Contractor at all times. Certified mail and written receipts shall be used in transferring sources to and from photographic processors. No retouching or other alteration on Government-Furnished prints or negatives is permitted.

1.4 REVIEW OF MATERIAL: All photographic identification numbers shall be checked against the drawings to ensure that they correspond properly with the labels. The Contractor shall verify that the proposed cropping, orientation, and dimensions will fit within the layout as designed.

PART II: MATERIALS

2.1 EXHIBIT PHOTOGRAPHS: As specified on the drawings and/or in Attachment B, Graphic Schedule.

A. Color Prints - Custom color, glossy finish, museum quality paper prints, as manufactured by:

Eastman Kodak Company
Rochester, New York 14650
800-242-2424 or 516-659-0410

B. Cibachrome Color Prints - Custom color, glossy finish, museum quality paper prints, as manufactured by:

Ilford, Inc.
West 70th Century Road
Paramus, New Jersey 07652
201-265-6000

C. Digital Imaging.

D. Black and White Prints - Resin coated, glossy finish, museum quality paper prints, as manufactured by Eastman Kodak Company, as specified in this Division, Part II, 2.1.A.

E. Finished Edges:

(1) Wrapped Edges - Custom color, glossy finish, museum quality paper prints, as manufactured by Eastman Kodak Company as specified in this Division, Part II, 2.1.A.

(2) Upwrapped Edges - Duraflex, custom color, glossy finish, 9-mil white-pigmented thick-base polyester, as manufactured by Eastman Kodak Company, as specified in this Division, Part II, 2.1.A.

2.2 TRANSPARENCIES:

A. Black and White - Cronopaque continuous tone, white semi-opaque diffused base.

B. Color shall be:

(1) Duratrans Color Transparency, as manufactured by Eastman Kodak Company, as specified in this Division, Part II, 2.1.A.

(2) Cibachrome - Cibachrome II transparency material, with diffused base, as manufactured by Ilford, Inc., as specified in this Division, Part II, 2.1.B.

2.3 MOUNTING ADHESIVES:

A. Murals - Mount color and black and white photographs with Mac-Tac Cold Mount Film, Series IP 2000 Adhesive, as manufactured by:

Morgan Adhesives
4560 Darrow Road
Stow, Ohio 44224
800-321-0011 or 216-688-1111

B. Prints - Mount color and black and white photographs with Mac-Tac Cold Mount Film, Series IP 2000 Adhesive, as manufactured by Morgan Adhesives as specified in this Division, Part II, 2.3.A.

2.4 PHOTOGRAPHIC COATING: To protect photos, the Contractor shall overlaminate and wrap edges, using Mac-Tac Protective Coating, Lustre Finish with UV protector, Series IP 7300, as manufactured by Morgan Adhesives as specified in this Division, Part II, 2.3.A.

2.5 PANEL ADHESIVE: Attach all photo panels to exhibit structures with 1/16" thick Scotch Mount Foam Tape, as manufactured by:

3M Industrial Specialties Division
3M 220-8E-04
St. Paul, Minnesota 55144
800-227-5085 or 612-733-4813

2.6 SUBSTRATES: In accordance with Division III, 2.3.C(1), (2), and (3).

2.7 ARCHIVAL MATERIALS: Negatives, transparencies, and prints shall be stored in archival protectors, as specified below, as manufactured by:

Light Impressions
439 Monroe Avenue
P.O. Box 940
Rochester, New York 14603-0940
800-828-6216

A. 4” x 5” negatives and color transparencies, place in Transview Sleeve, clear, Item Number 5313, and HD PolyChron Envelope, Item Number 5637.

B. 8” x 10” prints, place in a HD PolyChron Envelope, Item Number 5639.

C. 8” x 10” negatives and color transparencies, place in Transview Sleeve, Clear, Item Number 5315, and HD PolyChron Envelope, Item Number 5639.

D. Place negatives, transparencies, and prints in Archival Top Loaders, Item Number 3225, for inclusion in binder.

PART III: EXECUTION

3.1 EXHIBIT PHOTOGRAPHS:

A. Image Quality - The Contractor shall execute proper dodging, burning, and contrast correction to obtain highest quality prints from Government-Furnished source material. Color prints shall have high color saturation and sharpness. Tonal value of prints shall be consistent throughout the exhibit for each type of print: color, black and white, sepia tone, and hand-tinted.

B. Cropping - The Contractor shall adjust specified cropping to achieve a correct finished size. Crop for subject matter and best overall composition. When sizing and ordering photographs, allow for necessary bleed.

C. Murals - The Contractor shall ensure that continuous images line up from panel-to-panel. Individual panels shall be overlaminated and wrapped in accordance with this Division, Part III, 3.5.

D. Sepia Tone - Traditional sepia printing shall not be used. To achieve the sepia tone effect, the Contractor shall produce color prints from black and white source negatives using the required filters to result in the brown tone, specified in Attachment B, Graphic Schedule.

E. Transparencies - Transparencies shall have high color saturation, sharpness, and maintain appropriate color balance. Use diffusion background sheeting to ensure even backlighting of the entire image. The Contractor shall ensure the proper backlighting of the transparency, including control of lighting intensity, even distribution of the lighting, and control of heat build-up within the lightbox.

F. Digital Imaging -

(1) Scanning - The Contractor shall scan artwork, photographs, and other material to be used for digital output at the resolution recommended for the particular output device used, based on the final size of the image.

(2) Output - Colors in the final image shall match color samples, original artwork, or photographic images. The Contractor shall provide test samples of portions of the image at final image size, for COTR review and approval, to determine if the image resolution and colors are acceptable. The Contractor shall save the original scan on digital storage media.

3.2 QUALITY CONTROL:

A. Fixing - The Contractor shall ensure that all photographs are well washed and fixed prior to mounting them on substrate and shall test prints at random with test material available from photo suppliers.

B. Acceptance and Inspection - All Government-Furnished source material shall be inspected by the Contractor for final determination as to acceptability and use as photographic source material. If found to be unacceptable, the Contractor shall notify the COTR prior to processing or use of material.

C. Visual Images - Photographic processing and finishing shall be executed to ensure a continuous and compatible visual image or series of images throughout the exhibit.

D. Photographs - The Contractor shall be responsible for the quality and durability of photographic images produced and installed. The Contractor shall bear the costs associated with replacement or repair of those images which are unsatisfactory after installation because of improper techniques, use of inferior materials, improper mounting, handling, or installation.

E. Handling of Source Material - The Contractor shall provide proper professional care and handling of source materials and shall be responsible for their return to the COTR. The Contractor shall assemble photographic source materials in a black three (3) ring binder using archival sleeves, as identified in this Division, Part II, 2.7.A through D.

(1) Binder - Each prepared image shall be inserted into an 8 1/2" x 11" archival quality polypropylene sleeve punched with three (3) holes to fit into a black three (3) ring binder.

(2) Labeling of Photographs - The graphic number shall be written in clear, concise print with a film print pen on a small, foil-backed archival label. Typed labels are acceptable. The label shall be placed in the lower right corner of each sleeve. Labels shall not be placed directly on photographs, negatives, or transparencies.

(3) Graphic List - A typed list of all necessary rehabilitation and ordering information which shall include: image and graphic numbers, photograph title, type of image, and source.

(4) Handling of Materials - Images shall be handled wearing white cotton gloves or powder-free latex examination gloves.

3.3 SUBSTRATES AND PREPARATION: Exhibit photos shall be mounted directly on anodized aluminum, unless otherwise specified on the drawings. Prior to use, all aluminum shall be washed clean of any residual manufacturing chemicals, dirt, oil, or foreign substances to ensure a good bond. Cut panels evenly, to the correct dimensions, and finish edges. Aluminum shall be anodized prior to use as a photo substrate to provide corrosion resistance.

3.4 MOUNTING PHOTOS TO SUBSTRATE: The Contractor shall use a cold roll system press to mount the photographs in accordance with the manufacturer's specifications. Photographs shall be securely mounted to substrate surface, free from wrinkles, blisters, scratches, rips, tears, adhesive residue, or other imperfections. Trim photographs square and clean, and lightly ease all aluminum edges with fine grit sandpaper on a sanding block, held at a 45 degree angle. Corners shall be well fastened and eased, with no untrimmed pieces left. Substrate and photograph shall remain flat, true, and even after mounting.

3.5 PROTECTIVE COATING:

A. The Contractor shall apply clear film overlaminate so that it is wrapped around photo and aluminum sandwich and adhered to back of aluminum substrate for a two (2) inch overlap. Overlaminate film shall only be applied after all aluminum and photographic paper edges are trimmed clean and square.

B. The Contractor shall ensure that the clear film overlaminate provides a continuous bond with the photographic paper. The overlaminate shall be free of bubbles, scratches, dirt, indentations, and impressions from packing material used for transport and storage of overlaminated photographs.

3.6 APPLICATION TO EXHIBIT STRUCTURES: The Contractor shall apply photos to, or install on, exhibit structures and panels as specified on the drawings and/or Attachment B, Graphic Schedule. Exact measurement and precise alignment shall be required.

3.7 PHOTO CUT-OUTS: The Contractor shall follow the crop lines on the graphic references as specified on the drawings and/or Attachment B, Graphic Schedule. Photo cut-outs shall be made in accordance with the following:

A. Make the photo image from Duraflex, as manufactured by Eastman Kodak Company, as specified in this Division, Part II, 2.1.A;

B. Overlaminate the Duraflex with Mac-Tac clear overlaminate film, as specified in this Division, Part II, 2.3;

C. Laminate the print to its substrate;

D. Cut-out the image; and

E. Sand all edges smooth, free from tears, snags, and loose pieces. All edges shall be tightly adhered.

PART IV: SUBMITTALS AND APPROVALS

The COTR will inspect all finished photographic prints and murals at the Contractor's facility prior to their use in the exhibit. The inspection will be carried out in two (2) phases:

A. Inspection of photographic prints prior to mounting and overlaminating; and

B. Inspection of photographic prints after mounting and overlaminating.

Division VI

Graphics

PART I: GENERAL

1.1 WORK INCLUDED: Production of all graphics.

1.2 SPECIFIC REQUIREMENTS:

A. Work includes review and preparation of all Government-Furnished material, typesetting, proofreading, adjustments to graphic layouts, production of film positives for screenprinting, and conversion of digital files for specified imaging system output.

B. Submission of intermediate proofs, type galleys, samples, and revised layouts to the COTR for review and approval prior to production.

C. Production of all final graphic media. Media includes, but is not limited to screenprinting, label copy plaques, frisketed and spraypainted shapes, digital imaging, vinyl graphics, type, photo etched or sandblasted images, porcelain enamel panels, fiberglass-embedded panels, and cut-out graphic images or letters.

D. Production of original artwork.

1.3 PRODUCT HANDLING: All Government-Furnished source materials shall be returned to the COTR unaltered and undamaged. Protection from loss and physical damage shall be provided by the Contractor at all times. Certified mail or written receipts shall be used in transferring sources to and from graphic processors, and returning material to the COTR.

1.4 PROJECT CLOSEOUT: In accordance with Division IX.

PART II: MATERIALS

As specified on the drawings and/or in Attachment B, Graphic Schedule.

2.1 SCREENPRINTING: The Contractor shall use compatible screenprinting ink and solvent approved by the COTR for each substrate.

2.2 TYPE: The Contractor shall use type specifications in accordance with Attachment D, Label Schedule.

2.3 FRISKET AND SPRAY PAINTED SHAPES: The Contractor shall use the most compatible material for each substrate.

2.4 FILM POSITIVES FOR SCREENPRINTING AND MASKING: Right reading line or screen conversion on .004 Kodalith Ortho Film, as manufactured by:

Eastman Kodak Company
Rochester, New York 14650
800-242-2424 or 516-659-0410

2.5 SCOTCHPRINT:

A. Output Substrate:

(1) Flat Surface Without Rivets - 4 mil. white immediate high pressure vinyl, as manufactured by:

3M Commercial Graphics Division
3M Center, Building 220-6W-06
St. Paul, Minnesota 55144-1000
800-374-6772, Extension 214

(2) Flexible Surface With Rivets - 2 mil. flex white high pressure vinyl, as manufactured by 3M Commercial Graphics Division, as specified in this Division, Part II, 2.5.A.(1).

(3) Fabric Banners - 2.5 mil. flex image paper, as manufactured by 3M Commercial Graphics Division, as specified in this Division, Part II, 2.5.A.(1).

B. Output Adhesive:

(1) Non-Porous Materials - Controltac, as manufactured by 3M Commercial Graphics Division, as specified in this Division, Part II, 2.5.A.(1).

(2) Porous Material - Controltac Positionable, as manufactured by 3M Commercial Graphics Division, as specified in this Division, Part II, 2.5.A.(1).

C. Substrate - Adhere to .063 clear anodized aluminum.

D. Overlaminate - Wrap with clear protective laminate, Number 8910 lustre finish, as manufactured by 3M Commercial Graphics Division, as specified in this Division, Part II, 2.5.A.(1).

2.6 VINYL SHAPES AND LETTERS: GSP 220 3M Scotchcal Premium Film, in colors specified on the drawings, as manufactured by:

Gerber Scientific Products
151 Batson Drive
Manchester, Connecticut 06040
800-222-7446 or 203-643-1515

2.7 ADHESIVES:

A. Apply cut-outs and plaques with 1/16" Scotch Mount Foam Tape, as manufactured by:

3M Industrial Specialties Division
3M 220-8E-04
St. Paul, Minnesota 55144
800-227-5085 or 612-733-4813

B. Scotchprint - Mount Scotchprint image to substrate using Controltac or Controltac Positionable adhesive, as manufactured by 3M Commercial Graphics Division, as specified in this Division, Part II, 2.5.A.(1).

PART III: EXECUTION

3.1 REVIEW OF MATERIAL: Upon receipt of the graphic package, the Contractor shall review all graphic, photographic, and text materials prior to production.

A. Type - Label identification numbers shall be checked against the drawings to ensure that they correspond properly with photographs as specified in the graphic package. The Contractor shall verify that the proposed point size, line length, and other typographical specifications will fit within the layout as designed.

B. Graphics and Photographs - Graphic identification numbers shall be checked against the drawings to ensure that they correspond properly with the labels as specified in Attachment B, Graphic Schedule. The Contractor shall verify that the proposed cropping, orientation, and dimensions will fit within the layout as designed.

C. Any errors, inconsistencies, omissions, or incorrect identification shall be brought to the attention of the COTR for correction.

D. Screen Ink - The Contractor shall test the durability of each brand of screen ink on the exact substrate which will be used as a printing surface in the exhibit. The most durable combination of ink and substrate samples shall be submitted, to the COTR for review and approval, prior to the start of screenprinting. The ink and substrate shall be identified by brand name on the sample.

3.2 GRAPHIC LAYOUTS: Full-size layouts shall be on blue line translucent 1/8" graph paper including cut-out shapes of exact size and placement of all graphics identified by graphic number. Layouts shall include all typeset label copy positioned as specified and identified by label copy number. All sheets of the full-size graphic layouts shall be submitted in sequence by exhibit number. Each sheet shall be clearly numbered at the top.

3.3 TYPE: For type specifications, follow sizes and fonts in accordance with Attachment D, Label Schedule. The Contractor shall proofread label copy, verify sizes, and mark label copy line length and leading prior to typesetting. The Contractor shall proofread all typeset galleys, identify any obvious errors, and notify the COTR. Type galleys shall contain high resolution, be sharply focused, clean, crisp, opaque, and free from ragged or soft edges regardless of character size. Type shall be set with sufficient leading so that ascenders and descenders do not touch. Feet and inch characters shall not be used as substitutes for apostrophes and quotation marks. Type shall not be set with words divided by hyphens to achieve line length or with widows or with a single short last line of text. The Contractor is responsible for the correctness of Contractor-Generated typeset galleys. The Contractor shall revise all typeset galleys to reflect the changes, additions, and deletions identified by the COTR.

Full-size paper samples of set type shall be produced and submitted to the COTR for review and approval, as specified in this Division, Part IV, Item 4.2.

3.4 FILM POSITIVES: Positives shall be burned to achieve sufficient density to ensure good application of inked image.

3.5 SCREENPRINTING:

A. Durability - The Contractor shall determine, through testing, which type screenprinting ink is the most durable and long lasting for each substrate. All screenprinted images shall adhere completely to the substrate and shall not chip, flake, or pop off the substrate. Images and text shall be cured in accordance with manufacturer's specifications until they are completely dry.

B. Color Contrast - The Contractor shall produce samples of all color combinations. Upon review and approval by the COTR, color adjusting may be required in order to ensure high contrast between type, color, and background.

C. Quality of Printing - Perfect register, exact measurement, proper color match, opaque, and crisp images. Ghosting, ragged, and soft edges are not acceptable. All borders shall be a consistent width throughout panels. Weight of graphic images, text, or other images used in a "set" shall be consistent throughout the exhibit.

D. Preparation of Surface - All surfaces to be screenprinted shall be clean and free of grease, dirt, wax, or other coatings which can prevent the ink from adhering to the substrate. Plastic laminate surfaces shall be wiped with alcohol, and lacquer thinner, or other solvents recommended by the manufacturer to remove wax coating on surface.

3.6 FRISKET SHAPES: Graphic material produced by use of masks or stencils shall have clean, crisp, and continuous hard edges with no obvious knife marks or overspray. Paint colors shall be opaque and consistent. Painted surface shall be free of sags, bubbles, and dirt, with no excess paint build up. Prior to painting the colors, the Contractor shall prime the front and back surfaces with two (2) coats of primer, sanding between coats.

3.7 SCOTCHPRINT: The Contractor shall produce a high-quality 8” x 10” photo from the Government-Furnished source. This print shall then be scanned into the computer using a high resolution drum scanner. The high resolution output image shall be mounted onto specified substrate with Controltac adhesive. The finished Scotchprint shall be adhered to .063 clear anodized aluminum and overlaminated and wrapped with clear protective laminate, lustre finish. Scotchprint graphics shall be created with vertical seams evenly spaced with perfect registration to ensure that the image lines up from panel-to-panel. Tonal value of print shall be consistent from panel-to-panel.

3.8 DIGITAL IMAGES:

A. Scanning - The Contractor shall scan artwork, photographs, and other material to be used for digital output at the resolution recommended for the particular output device used, based on the final size of the image.

B. Output - Colors in the final image shall match color samples, original artwork, or photographic images. The Contractor shall provide test samples of portions of the image at final image size, for COTR review and approval, to determine if the image resolution and colors are acceptable. The Contractor shall save the original scan on digital storage media.

3.9 MOUNTING SCOTCHPRINT TO SUBSTRATE: The Contractor shall use a cold roll system press to mount the scotchprint, in accordance with the manufacturer's specifications. The print shall be securely mounted to the substrate surface, free from wrinkles, blisters, scratches, rips, tears, adhesive residue, or other imperfections. Trim aluminum panels square and clean, and lightly ease all edges with fine grit sandpaper on a sanding block, held at a 45 degree angle. Corners shall be well fastened and eased, with no untrimmed pieces left. Substrate and Scotchprint output substrate shall remain flat, true, and even after mounting.

3.10 FILM MECHANICAL PREPARATION AND FIBERGLASS EMBEDMENT: The Contractor shall provide film mechanical preparation, fiberglass embedment panels, embedding screenprinted graphics, or encapsultating photographic prints.

A. Film Mechanical Preparation - The preparation of film mechanicals, positives, or negatives, as specified below:

(1) High quality typesetting.

(2) Camera line and halftone negatives and contact and blow-back film positives.

(3) Production of maps, employing mulitple colors, utilizing computer graphics software compatible with current version of Adobe Illustrator.

(4) Assembly of film positive elements to color separated and registered films required for the imaging processes.

(5) Negative stripping of graphic elements for contacting to one-piece film positives for the production of etched and anodized exhibits.

(6) Furnishing and stripping sets of four-color process separations, including color proofs.

(7) Furnishing “posturized” film images utilizing standard special effect screens, i.e., mezzotint, steel etch, plus posturization based on the regulated exposure halftone (screen tint) method. Also included are straight line conversions from continuous tone images.

(8) Provide a blueline of filmwork.

B. Screen Imaging as follows:

(1) Screen image in tight register in up to twelve (12) colors, a sheet size range of 9” x 12” to 40” x 72” in editions of 12-to-40 copies per subject.

(2) Handle the above described screen imaging in groups of subjects (average 25 subjects) comprising one (1) job. All production phases of the work involved shall be concurrent and continuous. Submission of full color press proofs of each subject prior to the production run shall be required.

(3) Print 100-line four-color process images in perfect register which match Color Key, Match Print or other color proofs approved by the COTR. If intended for embedment, the inks and paper used for this printing shall be compatible with the embedment process.

(4) Print fine line detail, including mezzotint and other special effect conversion screen images, 85-to-133 line half-tone images and 10 pt. type without discernable saw tooth edge.

(5) Fabricate, image, and wash out screens in-house.

(6) Sheet and size paper stock from rolls.

(7) Mix and match ink colors to PMS color specifications or Government-Furnished color swatches.

(8) Hand paint illustrations following Government-Furnished samples, over a ghost image of the base illustration for subsequent trap by black overprint.

(9) Equipment - Printing equipment shall be automatic, semi-automatic, or of the one man squeegee type, but shall have a vacuum platen covering the full image area. Drying shall be accomplished by either heated mechanical dryers or drying racks.

C. Embedment - Furnish fiber glass reinforced polyester resin embedments of compatible screen imaged material in sizes and thicknesses as specified on the drawings.

3.11 PORCELAIN ENAMEL: The Contractor shall provide graphic and signage panels.

A. Film Mechanical Preparation - The preparation of film mechanicals, positives, or negatives, as specified below:

(1) Preparation of original black and white and full color illustrations and photographic images for reproduction, i.e., the intermediate photo mechanical steps required to convert original images into the necessary film form for porcelain enamel imaging.

(2) Type specification.

(3) Table work paste-up, negative stripping, and assembly of film positive and negative elements into final color separated and registered format required for porcelain enamel imaging.

B. Porcelain Enamel Imaging as follows:

(1) Tight registration in up to nine (9) colors, in panel sizes as specified on the drawings.

(2) Handle the above described imaging in groups of subjects (average 30 subjects) comprising one (1) job. From one (1) to four (4) identical additional copies of each subject may be required at the time of the initial production. All production phases of the work described will be concurrent and continuous.

(3) Fuse glass (enamel) to various substrates, including enameling steel, stainless steel, and plate glass.

(4) Image four-color process images in perfect registration of separation rulings from 55-to-150 lines per inch.

(5) Image fine line detail including mezzotint and other special effect conversion screens, 150-line half-tones and duo-tones, and 6 pt. serif type faces without discernable saw-tooth edge or other character defects.

(6) Capability to accomplish the required mechanical and chemical substrate preparation prior to imaging.

(7) Capability to fabricate, image, and reclaim screens in-house.

(8) Mix, apply, expose, develop, and fix enamel bearing photosensitive emulsions.

(9) Mix and match enamel colors to PMS color specifications and/or Government-Furnished color swatches.

(10) Furnish high quality color enhancement (hand painting) of line illustrations.

(11) Prepare films, mix and match colors, fabricate screens, image screen stencils, screen print, apply presensitized coatings, prepare metal for the enameling process, and image and fire porcelain enamel exhibits in-house.

PART IV: SUBMITTALS AND APPROVALS

The Contractor shall provide the following submittals for review and approval by the COTR:

4.1 Color Samples - Submit samples of shop-mixed, dry ink, or paint colors mixed to match the specified exhibit graphic colors to the COTR for review and approval prior to use in the exhibit. All color chips shall be marked with exhibit color number;

4.2 Type - Two (2) sets of full-size typeset galleys shall be submitted prior to making full-size graphic layouts, film positives, or screens;

4.3 Ink Samples - Samples of the brand of screenprinting ink and exact substrate which shall be used as a printing surface. These shall be identified as to brand name, and shall include the manufacturer's name, address, and telephone number. The COTR will test the sample to determine the durability of the ink on the substrate. Samples shall be submitted prior to the start of screenprinting;

4.4 Etching Sample - One (1) minimum 12” x 12” sample of full-size etching, as specified in Attachment B, Graphic Schedule;

4.5 Sandblasting Sample - One (1) minimum 12” x 12” sample of full-size sandblasting, as specified in Attachment B, Graphic Schedule;

4.6 Cut-Out Shapes and Letters - One (1) minimum 12” x 12” sample of full-size cut-out technique, as specified in Attachment B, Graphic Schedule;

4.7 Scotchprint - One (1) 12” x 12” sample of full-size scotchprint, as specified in Attachment B, Graphic Schedule;

4.8 Fiberglass Embedment - One (1) minimum 12” x 12” sample of full-size fiberglass embedment graphic panel, utilizing a graphic image as specified in Attachment B, Graphic Schedule, for this treatment;

4.9 Porcelain Enamel - One (1) minimum 12” x 12” sample of full-size porcelain enamel graphic panel, utilizing a graphic image as specified in Attachment B, Graphic Schedule, for this treatment; and

4.10 Graphic Layouts - Full-size layouts on blue line translucent 1/8" graph paper including cut-out shapes of exact size and placement of all graphics, identified by graphic number. Layouts shall include all typeset label copy positioned as specified and identified by label copy number. All sheets of the full-size graphic layouts shall be submitted in sequence by exhibit number. Each sheet shall be clearly numbered at the top.

Division VII

Artifacts

PART I: GENERAL

1.1 WORK INCLUDED: Preparation of artifact mounts for installation, including design, production, and installation.

1.2 ARTIFACT CATEGORIES: Artifacts which are included in the exhibit are identified in Attachment C, Artifact Schedule. The Government will determine the designated category for each artifact. The categories are defined as follows:

A. Non-Replaceable Artifacts - Those artifacts which can be considered non-replaceable for cultural, scientific, or historic reasons, those which are one-of-a-kind and are irreplaceable, or which have a high monetary value.

B. Delicate Artifacts - Those artifacts which because of their condition, materials, and construction have special preservation and handling requirements and should not be subjected to the shock of shipping or transport.

C. Replaceable Artifacts - Those artifacts which are readily replaceable, including reproductions, replicas, and facsimiles.

1.3 SPECIFIC REQUIREMENTS:

A. Travel to the park or to the Harpers Ferry Center Conservation Lab to meet with staff to inspect, measure, photograph, and produce templates needed for artifact mount production.

B. Handling.

C. Design individual custom mounts for artifacts in accordance with Attachment C, Artifact Schedule.

D. Production of preliminary and final mount drawings.

E. Review artifact dimensions to ensure that all artifacts will fit within the casework as designed.

F. Storage of replaceable artifacts at the Contractor's facility during the fabrication process.

G. Installation of custom mounts, mounting systems, and artifacts on panels, platforms, and in cases.

H. The Contractor shall be responsible for setting up a facility at the exhibit installation site to modify or alter pre-made case elements.

I. Complete and final cleaning of panels, platforms, and cases, and reassembly of cases after artifacts are mounted at the installation site. Acrylic vitrines shall be free of dust, prints, and smears on the interior and exterior surfaces following final case reassembly.

J. The Contractor shall transport all replaceable artifacts previously shipped to the Contractor's facility to the final installation site.

1.4 QUALITY ASSURANCE: The Contractor shall perform mountmaking for artifacts in accordance with the standards set forth in this Specification.

1.5 HANDLING: The Contractor shall utilize extreme care and abide by the Specifications set forth in this Division.

1.6 DAMAGE: Should the Contractor break, chip, fracture, scratch, or otherwise damage any artifact, the Contractor shall immediately notify the COTR. The Contractor shall not attempt any repair, treatment, or preservation procedure. The Government will execute any repairs.

1.7 SECURITY: The Contractor shall be responsible for the safety and security of any artifact in their possession, stored at the Contractor's facility, or for which the Contractor arranges shipment or transport. During the time the artifacts are being photographed, measured, fit, or installed in a Government facility, the Contractor shall handle the artifact with care and shall ensure that it is returned to authorized personnel when work is not in progress or has been completed. The security of artifacts stored in a Government facility is the responsibility of the Agency. Artifacts shall never be left by the Contractor in an exposed and unsecured area.

1.8 STORAGE: The Contractor shall store only artifacts which are defined by the Government as replaceable. All non-replaceable and delicate artifacts will remain at a Government facility during the design and fabrication of mounts. The Contractor shall measure, examine, and fit non-replaceable and delicate artifacts either at the Harpers Ferry Center Conservation Lab, park site, or regional storage facility.

1.9 PROJECT CLOSEOUT: In accordance with Division IX.

PART II: MATERIALS

2.1 MOUNTMAKING:

A. General - The Contractor shall use the same types and quality of material for mounting of non-replaceable, delicate, and replaceable artifacts. Fabrication materials shall be of the highest quality and shall be non-damaging to the displayed artifacts. All mountmaking materials that will be used for on-site mounting shall be available at the final inspection for review and approval by the COTR.

B. Materials Considered Safe for Use with Artifact Mounts - The following are considered safe to use as mounting, buffering, padding, and backing materials: Acrylic, i.e., polymethyl methacrylate ester; metal, i.e., brass, iron and aluminum; polyethylene foam products; polyethylene plastic sheeting; polyester sheeting, i.e., mylar; fiber-fill batting, i.e., spun polyester; undyed cotton and linen fabric; and acid-free paper products.

C. Materials Considered Unsafe for Use in Artifact Mounts - The following are known to emit harmful vapors (VOCs) and shall not be used because the gases will accelerate the deterioration of artifacts found within the artifact's immediate environment: wood pulp paper products, unsealed wood, wool, sulphur dyes, vulcanized rubber, protein based glues, polysulphide adhesives, polyvinyl acetate, emulsified resins, cellulose acetate resins, drying oil products, oil based paints, PVA latex based paints, paints and varnishes with ester type solvents, polyvinyl alcohol, lead base paints, formaldehyde containing products, cellulose nitrate, polyurethane resins, polyurethane foam products, and polyvinyl chloride.

2.2 ARTIFACT TRANSPORT:

A. Packing Materials - Protect all artifacts from direct contact with packaging materials by wrapping them first with Kimpack crepe paper, soft acid-free tissue paper, or untreated 100% cotton t-shirt fabric.

(1) Packing materials which are acceptable:

(a) Polystyrene foam “peanuts” are acceptable if they are not the only packing material being used;

(b) Polyethylene cellular foam, i.e., ethafoam, is acceptable for packing large, heavy artifacts. Cut the foam to shape to fit the artifact; and

(c) Bubble pack is acceptable if it is not the only material being used.

(2) Packing materials which are unacceptable:

(a) Shredded Paper or Straw - They retain moisture and are a fire hazard;

(b) Sawdust, Wood Chips, or Excelsior - They shift and allow artifacts to sink, absorb moisture, attract pests, have a high dust content, and are acidic;

(c) Newspaper - It leaves smudges and attracts pests;

(d) Tape - It is unacceptable to allow any type of pressure sensitive tape to come in contact with artifacts. This includes tape on framed glass and mirrors; and

(e) Recyclable Packing Peanuts - Peanuts made from corn starch disintegrate and become sticky when damp.

(3) Crates - Crates for shipping artifacts shall be fabricated of 1/2" marine grade or exterior plywood with a minimum of one (1) finished surface.

2.3 INSTALLATION:

Silica Gel - The Contractor shall furnish silica gel as a humidity ballast for artifact cases when specified on the drawings. Whether the silica gel is provided by the Contractor or Government-Furnished, the Contractor shall fabricate containers to hold the silica gel. Types of silica gel which the Contractor may be required to provide are:

A. Arten Gel - Silica gel mixture. This is loose silica gel with no containers provided. The Contractor shall fabricate aluminum trays to hold the mixture at a depth of approximately one (1) inch. Arten Gel, as distributed by:

Art Preservation Services
223 East 85th Street, Suite B2
New York, New York 10028
212-988-3869

B. Gortex - 6" x 6" x 1/2" silica tiles - These are most effective when mounted so that both sides are exposed to the air. The Contractor shall fabricate brackets as necessary to mount the tiles in the ballast chambers. Gortex Silica Tiles, as manufactured by:

W.L. Gore Associates, Inc.
100 Airport Road
P.O. Box 1550
Elkton, Maryland 21921
410-392-4440

C. Artsorb Silica Gel - Cassettes or sheets, purchased in bulk and small quantities, as manufactured by:

Fuji Silysia Chemical Ltd.
Bank of America Financial Center
121 SW Morrison Street, Suite 865
Portland, OR 97204
503-295-1933

PART III: EXECUTION

Artifacts will be accessioned by the Government as a part of their permanent collection as will most of the purchased reproductions and natural science specimens. The design, production, and installation of mounts for these types of artifacts by the Contractor shall be in accordance with the guidelines, as follows:

3.1 MOUNTMAKING:

A. Mount Design Drawings - The Contractor shall provide sketches and final drawings of proposed mounts for artifacts, to the COTR for review and approval prior to fabrication, in accordance with this Division, Part IV, 4.1.

B. Mounting Systems - When work requires design of a modular or flexible component display system for use in the exhibit, the system shall be designed so that as much as possible of the individual parts can be pre-fabricated and fit together on-site. Artifact mount design shall be coordinated with the general design of the exhibit.

C. Mount Design Guidelines:

(1) Mounting materials shall be compatible with the artifact and shall be inert, cushion the artifact, and have smooth edges. Replacement and repair of existing mounts shall be of like design and materials unless otherwise specified on the drawings.

(2) Mounts shall provide adequate support to prevent physical stress or unbalanced weight distribution on the artifact. The center of gravity and original intended use shall be considered.

(3) Mounts shall not be permanently attached to any artifact. Each artifact shall be easily removable from its mount in the event of curatorial maintenance or emergency.

(4) Fastening system shall be based on a mechanical design and use no adhesives or sticky substances.

(5) Mounts shall be designed to minimize vibration and abrasion.

(6) Mounts shall protect artifacts from theft.

D. Mount Fabrication:

(1) Original artifacts shall never be drilled, trimmed, tacked, nailed, screwed down, or glued down. The Contractor shall not use “museum wax,” silicone rubber, or adhesive tapes.

(2) Original clamps, hooks, strings, and straps already attached to artifacts shall not be used for support or to take weight off of the artifact.

(3) Mounts shall not utilize fabrics or materials that contain unstable dyes which could transfer colorants to artifacts.

(4) Sharp edges shall be removed from materials in close proximity to the displayed artifacts.

(5) An artifact shall never be forced to fit in a bracket, cradle, or other mount. The mount shall support, not compress; straps or brackets shall fit snugly, not tightly.

(6) Clamps and brackets shall be padded with non-abrasive, inert materials.

(7) Replacement mounts shall be of like kind and materials unless otherwise specified on the drawings.

E. Handling Artifacts:

(1) Do not smoke, eat, or drink while working with artifacts.

(2) Avoid haste in handling artifacts; use both hands when carrying an artifact.

(3) In moving any artifact or group of artifacts, avoid travel shock.

(4) Clean hands prior to handling artifacts. Wear white, lint-free, clean cotton gloves when handling artifacts.

(5) Wear no jewelry which may scratch artifacts.

(6) Use more than one (1) person in moving a cumbersome or heavy artifact.

(7) Know the nature of the artifact you are going to handle: structural compositions, weak, and strong elements.

(8) Limit the number of artifacts put in a carrying-box. Never put light-weight and heavy artifacts in the same container. Always use separation battens, padding, or some kind of cushioning material between pieces when more than one (1) artifact is put into a single box.

(9) Never discard any packing or padding material until it has been thoroughly searched, especially if breakage of the unpacked artifacts is known to have occurred.

(10) All Government tags shall remain with the item for identification; when possible, tags shall remain tied to the item.

3.2 TRANSPORTATION: Handling, packing, and shipping of artifacts requires special consideration and care. Any artifact shipped or transported by the Contractor shall be packaged during transport. Items too large to be packaged shall be wrapped and protected to avoid damage to the article. The Contractor shall not ship any large items via commercial transport without prior authorization from the COTR.

A. Shipping List - Items sent to the Contractor from the Government will contain an inventory list. If for any reason this list is missing, the Contractor shall contact the COTR immediately. When unpacking the artifacts, the Contractor shall examine each artifact and indicate on the list that the individual item(s) have been received, note the condition of the artifact(s), and return a copy of the list to:

Office of the Registrar
National Park Service
P.O. Box 50
Harpers Ferry, West Virginia 25425-0050

When shipping or returning artifacts or mounts, the Contractor shall include a copy of the shipping list and shall make an additional listing of the mounts.

B. Wrapping and Packing:

(1) Wrapping - Each artifact shall be individually wrapped and identified with the exhibit identification number, catalog number, and other associated numbers on the exterior of the package. When packing multiple artifacts in a single box, keep contents similar in materials and weight. Mark each package with a quantifying label such as “1 of 5.”

(2) General Crating and Boxing of Artifacts:

(a) Crates shall be fabricated of 1/2" marine grade or exterior plywood with one (1) finished surface.

(b) Allow a minimum of two (2) inches of packing material around individual artifacts. There shall be at least three (3) inches on each side between any inner box and exterior shipping container.

(c) Nail crates together on all sides except the top or front that is intended to be the opening side; use screws to fasten, and clearly label "Open This Side First." If needed, instructions for unpacking the crate shall be placed on the top inside the crate. Put "Instructions Enclosed" underneath the label "Open This Side First."

(d) Each crate shall have a packing list attached to the exterior. Instructions for unpacking the crate may be included with the packing list or affixed to the interior of the side to be opened first.

(e) Label the box appropriately with "This Side Up" or "Fragile." Labels shall be legible and easily seen. If reusing a previously used box or crate, mask out previous labels with paint or brown paper to provide a clean writing surface.

3.3 INSTALLATION:

A. Handling of artifacts at the installation site shall be in accordance with the guidelines in this Division, Part III, 3.1.E.(1) through (10). Provide a clean, undisturbed work area at the exhibit site, away from visitor access and any conditions which could be harmful to the artifacts, such as extremes of temperature and humidity, direct sunlight, smoke, and materials unsafe for direct contact. All identification tags removed from artifacts when they are mounted in the exhibit shall be turned over to the COTR. Do not discard any identification tags or remove them prior to final installation of the artifact.

When repairing or replacing an existing mount, care shall be taken not to damage, disturb, or otherwise impact negatively on other artifacts in a display. If the repair or replacement of a mount calls for complete removal of all artifacts in a case, the Contractor shall not undertake this task. Arrangements shall be made with the COTR prior to disassembly of a artifact case. The Contractor shall ensure that artifacts removed from an artifact case during repair of a mount are secured by park staff.

B. Storage - The Contractor shall store artifacts in a lockable, protected area to eliminate damage and theft. Access to the artifacts shall be limited to the Contractor and his staff. All artifacts shall be locked up when not in use.

PART IV: SUBMITTALS AND APPROVALS

The Contractor shall provide the following submittals for review and approval by the COTR:

4.1 Preliminary Drawings - Submit three (3) copies of preliminary design drawings showing the proposed mount, method of fastening, colors required, materials, and dimensions. The COTR will mark the drawings to indicate revisions, approved, or disapproved, and return one (1) marked-up copy to the Contractor. After receipt, the Contractor shall revise these drawings prior to preparing the final drawings.

4.2 Final Drawings - Submit three (3) copies of the final artifact mount drawings incorporating all requested revisions prior to fabrication of the artifact mounts.

4.3 Drawing Format - Provide each artifact mount drawing on 8-1/2” x 11” paper, identified with the park name and the artifact number. Artifact mount design drawings shall include isometric views of the mount which clearly show how and where the mount provides support for the artifact. Include notations which describe mount dimensions, materials, finishes, fabrics, and colors.

Division VIII

Setup and Installation

PART I: GENERAL

1.1 WORK INCLUDED: Setup and installation of all exhibit elements.

1.2 SPECIFIC REQUIREMENTS:

A. Pre-installation Meeting at the Contractor's facility.

B. Staging of the exhibits and audiovisual components at the Contractor's facility, for inspection by the COTR prior to final packing or crating for installation.

C. Packaging and shipping of exhibit elements and materials to the site.

D. On-site installation of exhibit elements and materials.

1.3 PRODUCT HANDLING: The Contractor shall receive, store, handle, and transport all exhibit units and related materials in a safe and secure manner. In the event that damage occurs during shipping, the Contractor shall be responsible for repair or replacement of any broken, damaged, or otherwise unusable elements.

PART II: MATERIALS

2.1 WOOD CRATES: The Contractor shall fabricate or supply wood crates, using CDX plywood and pine framing in thickness required, based on size of crate. Crates shall be fastened using galvanized nails and screws for crate top.

2.2 PACKING MATERIALS: The Contractor shall pack materials using polyethylene air bubble cushioning material such as "bubble pack," flexible corrugated packing material, polyfoam peanuts, and heavy blankets.

2.3 INSTALLATION TOOLS AND MATERIALS: The Contractor shall provide all installation tools and materials in sufficient number to accomplish the job, such as vacuum cleaner, ladders, tools, trash bags, cleaning materials, interior and exterior protective covers, barriers, and “No Admittance” signs.

PART III: EXECUTION

3.1 PRE-INSTALLATION MEETING: Members of the Contractor's installation team shall meet with the COTR at the Contractor's facility to discuss the project and review work at the time of the exhibit staging.

3.2 STAGING AND ACCEPTANCE:

A. Setup - Prior to shipping the exhibit elements to the site for installation, a thorough inspection of the completed and functioning exhibits will be made by the COTR at the Contractor's facility. The Contractor shall place all exhibit units in exactly the same configuration and dimensioned area as they will be installed. Focal points specified on the floor plan shall be laid out on the floor with masking tape.

B. Demonstration - All units shall be fully operational at the time of final inspection. Exhibit units with built-in lighting, electrical, mechanical, and audiovisual equipment shall be connected to power sources. The Contractor shall demonstrate that each operation is fully functional, in accordance with Division IV, Part I.

C. One (1) copy of the Preliminary Maintenance Manual shall be submitted to the COTR for review and approval at the final shop inspection.

3.3 WRAPPING AND PACKING:

A. Structures - Structures shall be blanket-wrapped with all attached exhibit elements protected.

B. Audiovisual Equipment - Audiovisual equipment shall be shipped in original shipping box from manufacturer with all original packing materials in place.

C. Photographs - The Contractor shall use flat, smooth-surfaced materials between overlaminated photographs prior to transportation to the installation site. The Contractor shall ensure that dust, dirt, sawdust, bubble wrap, styrofoam peanuts, and the rear surfaces of other overlaminated photos do not come in contact with the face of overlaminated photographs and leave impressions in the overlaminate surface.

D. Graphics - All screenprinted surfaces shall be protected with brown paper secured with masking tape until completion of final on-site setup.

E. Artifacts - In accordance with Division VII.

3.4 SHIPPING: The Contractor shall pack and crate all materials which shall be shipped by his own or commercial carrier in such a manner that they will arrive at the designated site undamaged. If exhibit elements are damaged in transit, the Contractor shall bear the full responsibility for repair or replacement.

3.5 INSTALLATION:

A. Installation Team - The Contractor shall provide adequate personnel to install the exhibits, including the Project Manager. The Contractor shall provide all required tools and materials in sufficient number to accomplish the job.

B. Clean Up:

(1) The Contractor shall maintain all areas in a clean condition on a daily basis and provide means of preventing dirt or waste material from being tracked into adjacent areas of the building. The Contractor shall provide bags and containers for storage of trash. The Contractor shall be responsible for removing waste materials from the park generated during installation.

(2) Drilling and cutting shall be complete prior to the installation of artifacts, models, original art, and audiovisual equipment to avoid excessive dust and debris which may damage the sensitive items.

(3) The Contractor shall thoroughly clean exhibit surfaces to remove hand prints, dust, and miscellaneous markings generated during the installation.

(4) The Contractor shall handle all acrylic, glass, and graphic panels with clean gloves to minimize hand prints of natural skin oils. Panels shall be thoroughly cleaned until all dust, prints, and smears are removed from the face and rear surfaces.

(5) The Contractor shall provide labor, materials, equipment, and supplies for final cleaning of the exhibit site, including vacuuming the entire exhibit space.

C. Storage - Exhibit elements shall be stored at the exhibit site during installation.

D. Existing Work - The Contractor shall request authorization from the COTR prior to cutting, drilling, altering, or removing material within the building. Work that is replaced shall match existing work. Anything damaged or defaced within the building due to the Contractor's error during installation shall be restored to the original condition by the Contractor. Restoration work shall be coordinated with the COTR.

E. Protection - The Contractor shall provide adequate protection for parts of the building, its contents, and occupants wherever work under this contract is being performed. This includes dust protection where required and protective coverings for interior surfaces and furnishings adjacent to the work area. The Contractor shall provide cardboard, plastic, or heavy kraft paper for the floor in the exhibit and adjacent work areas. The Contractor shall provide barriers and post "No Admittance" signs. The Contractor shall also ensure that artifacts are not left unattended and that they are stored in a secure location when the work site is unattended.

3.6 WALK-THROUGH INSPECTION: Upon completion of the on-site work, the Contractor shall conduct a final walk-through of the exhibits with the COTR and park staff to identify punch list items, demonstrate operation of all electrical, mechanical elements, and audiovisual components in the exhibit and to demonstrate access into artifact cases and audiovisual equipment enclosures. The Contractor shall notify the COTR ahead of time when the walk-through can be scheduled and shall assemble installation team members with the appropriate expertise to demonstrate the equipment and answer questions.

3.7 OPERATIONAL TRAINING SESSION: After inspection and acceptance of the installed exhibits, the Contractor shall conduct an operational training session for the COTR and park staff, using the Final Maintenance Manual as an instructional aid. The training session shall include day-to-day maintenance and cleaning of all exhibit elements, minor repair and touch-up procedures, exhibit case access, and start-up and shut down procedures for all audiovisual equipment and exhibit lighting.

3.8 FINAL MAINTENANCE MANUALS: The Contractor shall deliver two (2) copies of the Final Maintenance Manual during the installation, incorporating all changes or corrections to the Preliminary Maintenance Manual.

Division IX

Project Closeout

PART I: GENERAL

1.1 WORK INCLUDED: Preparation of project closeout components.

1.2 SPECIFIC REQUIREMENTS:

A. Maintenance Manuals.

B. Park Maintenance Kit.

C. Closeout Package.

D. Storage of exhibit resource materials at the Contractor's facility.

PART II: MATERIALS - The Contractor shall provide:

2.1 MAINTENANCE MANUALS: Black, three (3) ring binders to hold 8-1/2" x 11" format paper, white and black illustration boards, plastic sleeves, pockets, and tabbed identification dividers.

2.2 PARK MAINTENANCE KIT: A permanent container, with a lid, to hold all sample finishes, applicators, and bottles or cans for paints, stains, varnishes, thinners, solvents, special finishes, and waxes. Brushes, finish applicators, keys, screw drivers, wrenches, and other special tools shall also be included.

2.3 CLOSEOUT PACKAGE: Black, three (3) ring binders, digital storage media (3-1/4" disks, SyQuest 200MB cartridges, and Zip disks), 22" x 34" drafting vellums, finish samples (laminates, paints, stains, carpet, and fabrics), plastic sleeves, paper pockets, archival paper and packing materials, and photo archival materials, in accordance with Division V, Part II, 2.7.

PART III: EXECUTION

3.1 MAINTENANCE MANUALS - Preliminary and Final Maintenance Manuals shall include the following:

A. Assembly Instructions - Pages shall be 8 1/2" x 11" sheets, punched and inserted into three (3) ring binders. The spine of the binder shall be labeled "Maintenance Manual - (name of project and site)." Provide actual paint, ink, plastic laminate, fabric, and finish samples in colors specified on the drawings, on 8 1/2" x 11" white illustration board. For all screenprinting on plastic laminate, use actual sheets of plastic laminate for sample board substrate. All sample boards shall be punched for insertion into a three (3) ring binder. Sections shall be separated by labeled and tabbed pages.

B. Content - The Contractor shall include the following:

(1) Title page - Provide a title page with the name of the exhibit, the site, and installation date.

(2) Index - Provide a list of contents.

(3) Contract Information - Provide name, address, and telephone number for all Contractors who produced work for the exhibit, identifying the portion of the work which they provided.

(4) Cleaning Instructions - Provide instructions for cleaning all exhibit structures, finishes, graphic panels, tactile models, and screened material. Include brand names of recommended cleaning materials and list the name, address, and telephone number of the manufacturers or distributors of the cleaning products. “Not to be used" materials and techniques shall be identified.

(5) Repair Instructions:

(a) Describe specific techniques for repairing damage to exhibit surface materials such as: wood and painted finishes, screened areas, plastic laminates, faux finishes, fabric, metal, acrylic, polycarbonate, and glass.

(b) Include final wiring diagrams for all equipment. Provide Government-Furnished instructions for repair or replacement of audiovisual equipment.

(6) Artifact Care and Handling - Provide information or direction for care, maintenance, and cleaning of the artifact mounts, including how to detach the object from the mount. Provide copies of all final artifact mount drawings.

(7) Product List and Catalog Cuts - List brand names of off-the-shelf products purchased for use in the exhibit and the name, address, and telephone number of the supplier or distributor. Provide legible machine copies of catalog cuts. However, if copy of original cannot be produced without loss of readability, original catalog cuts shall be provided. Include at least one (1) original copy of the manufacturer’s information packed with Contractor-Purchased off-the-shelf equipment, inserted into 8 1/2” x 11” clear plastic sleeves, punched for three (3) ring binders.

(8) Warranties - Provide manufacturer’s warranties for all off-the-shelf equipment purchased by the Contractor.

(9) Access Instructions - Provide isometric or exploded view drawings which clearly and sufficiently illustrate access to artifact, desiccant, and lighting chambers, audiovisual equipment, and electrical and mechanical devices in the cases and in the building. The drawings shall identify the exhibit number and any information relevant to opening or dismantling the structures.

(10) Electrical and Mechanical Instructions - Provide maintenance and operation instructions for all lighting, electrical, and mechanical equipment provided by the Contractor as follows:

(a) As-built drawings of the exhibit lighting plan which show final fixture placement, the manufacturer, model number, and any specialized equipment such as gels, diffusers, and louvers. Include specific instructions for re-lamping.

(b) Catalog cuts and manufacturer's printed instructions for all ceiling lighting fixtures, lighting tracks, lighting track fixtures, lamps, connectors, transformers, adapters, power strips, clocks, sensors, timers, ventilation fans, thermostats, motors, switches, pushbuttons, fibers, lenses, illuminators, dimmer controls or other electrical, mechanical, or lighting equipment.

(11) Color and Finish Samples - Provide actual samples of all materials used in the exhibit such as: woods, veneers, masonry, metal trim, laminates, fabrics, carpets, paints, and inks. Material shall be mounted on 8-1/2" x 11" white illustration board, clearly labeled with the color name and number, the manufacturer's brand name, and other pertinent product identification, keyed to the drawings for location. One (1) 8-1/2" x 11" sample shall be provided for each screenprinting ink color and substrate combination used in the exhibit. Samples of specialized techniques such as sandblasting or etching samples shall also be provided.

(12) Exhibit Plan Notebook - A copy of the Graphic Schedule and facsimiles, Artifact Schedule and facsimiles, and Label Schedule shall be included. All revisions and updated information shall be clearly noted.

(13) Exhibit Drawings - Include one-half (1/2) size copies of the exhibit drawings and insert into the Maintenance Manual.

3.2 PARK MAINTENANCE KIT: The Contractor shall provide the following items in a permanent container with a lid.

A. Touch-Up Kit - Touch-up materials for all finishes and surfaces, including applicators for each sample. Label each sample as to contents and color.

B. Keys - The Contractor shall provide two (2) sets of all keys used in the exhibit. Keys shall be identified with the exhibit project name and number.

C. Tools - The Contractor shall provide two (2) sets of special screwdrivers for tamperproof screws, wrenches for roto locks, allen (hex) wrenches, or any other specialized tool which shall be used for case access, mobility, or security.

D. Cleaning Kit - One (1) container of recommended cleaner, and appropriate cleaning wipes, for each material and finish used in the exhibit, including instructions and materials for special stains which require cleaning, sanding, and reapplication of finish.

3.3 CLOSEOUT PACKAGE: The Contractor shall assemble and organize all resource material used for production of the exhibit and identify individual pieces with the project name and exhibit number. This material shall include a packing list with the contents of the package, along with the name of the project and date. The Contractor shall include each of the following in the closeout package:

A. Exhibit Drawings - As-built drawings clearly labeled with the date they were completed by the Contractor.

B. Text - Digital files of exhibit text for use in the exhibit.

C. Photo Negatives and Sources - All Government-Furnished and Contractor-Produced photographic source materials in a notebook and archival packaging, in accordance with Division V, Part III, 3.2.E.

D. Artwork and/or Graphics - Government-Furnished and Contractor-Produced artwork, sketches, layouts, and digital files. Digital files shall include screen and printer fonts, native files, placed or “linked” images, and printed documentation of the programs used to produce the artwork.

E. Maintenance Manual - One (1) copy of the Final Maintenance Manual incorporating all changes or corrections identified by the COTR in the Preliminary Maintenance Manual.

F. Exhibit Plan Notebook - The Contractor shall return the Government-Furnished Exhibit Plan Notebook and shall add any changes, alterations, or additions made during the contract period to the Exhibit Plan Notebook.

G. Reference Materials - The Contractor shall return Government-Furnished reference materials.

H. Keys - The Contractor shall provide one (1) set of all keys used in the exhibit for the COTR. Keys shall be identified with the exhibit project name and number.

I. Tools - The Contractor shall provide one (1) set of special screwdrivers for tamperproof screws, wrenches for roto locks, allen (hex) wrenches, or any other specialized tool which shall be used for case access, mobility, or security.

3.4 STORAGE OF EXHIBIT RESOURCE MATERIALS AT THE CONTRACTOR'S FACILITY:

A. During Fabrication - The Contractor shall ensure that all Government-Furnished books, negatives, archival, and resource materials are stored in a safe place and remain in the same condition as they were received.

B. After Project Completion - The Contractor shall store film positives generated for the project for a minimum of one (1) year at the Contractor's facility.

PART IV: SUBMITTALS AND APPROVALS: The Contractor shall submit the following material to the COTR and shall notify the COTR when the package is shipped, identifying the expected date of arrival.

4.1 MAINTENANCE MANUAL: Provide one (1) copy of the Preliminary Maintenance Manual to the COTR for review and approval during the final inspection of exhibits at the Contractor's facility. The Contractor shall incorporate all changes or corrections identified by the COTR in the Preliminary Maintenance Manual and submit three (3) identical copies of the Final Maintenance Manual to the COTR at the installation.

4.2 PARK MAINTENANCE KIT: Provide one (1) kit to the COTR during installation of the exhibits.

4.3 CLOSEOUT PACKAGE: Provide all materials which comprise the closeout package and submit to the COTR for review and approval after the project has been installed and all work is completely finished.